# Chapter 8

## The 1978 GAO Report

In October of 1978, the General Accounting Office (GAO) of the US issued a report titled "Getting A Better Understanding of The Metric System–Implications If Adopted By The United States." It is a snapshot of the late 1970s solipsistic view of metrication as the rest of the world converted to the metric system. The report seems very uneven in its views and understanding of the metric system. It has the look of a report by committee where those who wrote each chapter might have been insulated from one another.

The report is clear on asserting that a decision *has not been made* to convert to the metric system by the United States of 1978. The 1975 Metric Hearings are in line with that statement: "...the national policy is not to prefer one system over the other but to provide for either to be predominant on the basis of the voluntary actions of those affected." It is also stated by the GAO that:

> "The [metric] Board is not to advocate metrication, but is to assist various sectors when, and if, they choose to convert." It is also "...to encourage retention of equivalent customary units (usually by way of dual dimensions) in international standards or recommendations;" (1-10)

The method used by the GAO was essentially to perform extensive polling of multiple US industries, and finally the public, about how they thought metrication would affect them. The polls could only measure emotions as their targets of the inquiry. The US had not experienced any change, and therefore the participants could only provide a visceral

viewpoint. Not surprisingly, small businesses believed the disadvantages would outweigh any benefits.

The GAO begins with responses that are congruent with long-time US economic mythology:

> Present sizes have developed over the years in the marketplace to meet demand. ... There is little doubt that increased standardization and rationalization could result in benefits, although this objective could be achieved using the customary system.

This is the sort of false equivalence that can be asserted when no specifics are studied. One can imagine a person who currently uses Roman Numerals, and has never encountered Hindu-Arabic ones, might make the same statement.

The beginning of the report seems like a strange loop of inconsistency (pg vii):

> The total cost of metrication in indeterminable in spite of various estimates that have been cited in the last decade by various organizations and individuals.

and two paragraphs later:

> However, based on the limited cost data that was available to the GAO and the input from various representatives from a wide spectrum of organizations throughout the country, the cost will be significant–in the billions of dollars.

In a swelling of ersatz democratic pride, the report indicates:

> Since a decision will affect every American for decades to come, GAO believes the decision, which is to continue with the current policy or change it, should be made by the representatives of the people–the Congress.

The beginning of the report continues its emphasis on what the current policy is, and launches into a short history of the metric system. The Adams Report of the 19th century is quickly encountered. The GAO points out:

 

> Adams concluded in his report that the Congress should not change the existing system but should fix the standards for the units. .... He believed that the time had not yet arrived in which he could recommend
>
> * * * so great and hazardous an experiment * * *, as that of discarding all our established weights and measures, to adopt those of France in their stead.

The GAO quickly mentions that the Mendenhall Order was "an administrative action." In light of their democratic stance, one might question their view of the validity of the Mendenhall Order. The technical superiority of the contemporary metric standards, and the failure of the British ones, was not mentioned as the driving force for this ad hoc legal patch by Thomas Corwin Mendenhall (1841-1924) that Congress ignored.

The 1971 National Bureau of Standards Report *A METRIC AMERICA, A Decision Whose Time Has Come* is mentioned with this interjection:

> A major area of controversy was the impartiality and completeness of the NBS metric study. The critics, which included former members of the study group and its advisory panel, contended that NBS was biased in favor of conversion while performing the study and reporting the results.

Then an interesting historical tidbit:

> Metric conversion legislation was passed in the Senate in 1972 providing for a predominantly metric America within a 10-year period. It was introduced into the House where no action was taken.

This may be the closest the US has come, from a legislative standpoint, to becoming a metric nation.

The GAO report generally sees the metric system through Olde English measurement usage, and not as a new and upgraded way of implementing measures. The report states "Millimeters and centimeters would be used instead of inches and feet." They then offer an inch/centimeter ruler as an example. Think about the statement and it

  

should be clear that millimeters are not like inches or feet. The reader is told that "The metric system is decimal because prefixes are used to indicate multiples and sub-multiples of 10." The majority of metric prefixes now use 1000, and this is clearly the best practice for implementing metric quantities. The GAO has a frivolous objection to the pascal: "The major objection to the pascal is that it is too small of a unit with which to work. It takes about 1,000 pascals to equal 1 pound per square inch." So a Kilopascal would be about 1 pound per square inch, the base unit for metric usage would simply be Kilopascals. This statement demonstrates the provincial understanding of the metric system often shown in this report.

A more legitimate complaint is that a pascal is rather abstract. This can be remedied easily by using newtons per square meter instead of pascals, as pounds per square inch are used in the current Olde English measurements.

Chapter 3 of the Report highlights ascribed advantages and disadvantages of metric. The initial positive aspects related by the GAO have been covered by metrication consultant Pat Naughtin many times:

1. Conversion would provide opportunities for worthwhile changes [needed reforms to implement efficiency] and

2. Conversion would stimulate the economy.

There is no discussion of the advantage of using millimeters versus centimeters, no discussion of whole number usage with milliliters, and grams and how that could simplify matters, just vague platitudes.

The ascribed disadvantages of the metric system begin with an appeal to the mythology of Technical Darwinism, and an appeal to the "practical" over the theoretical:

> The Customary System is a better measurement system
>
> The U.S. customary system is tailored to meet practical everyday needs of human beings. It is firmly established, and is not obsolete or complex. It came into being by natural selection. Although use of the metric system has been legal in the United States since 1866, the customary system survives because it meets a need. ....

 

The same old Goldilocks pseudo-arguments about Olde English measures are employed:

> The meter, about 4 inches longer than the yard, is too great a length for general application, and the gram is too small to be practical. Metric names are more difficult to say and remember.

The Report has no clear conclusions on US trade, as that is the view which came back from the questionnaires sent to representatives of the Fortune 500. The GAO surveyed people in Business, and discovered:

> Few of the respondents knew the U.S. policy on metric conversion. As the following chart shows, almost half of the respondents believed conversion to be mandatory. (5-13). and "Few believed the Government should legislate or enforce conversion." (5-21).

There are many other chapters in the 1978 GAO Report. For the moment we will look at the overall view of the GAO toward metric conversion. We will skip to the end of the Report and look at the GAO conclusions for an answer. Chapter 30 of the Report examines lessons learned by foreign countries. If the US decided to become metric, here is the GAO's list of what we should embrace:

> – A firm Government commitment to convert is necessary.
>
> – A central body should be established early to plan and coordinate the conversion and inform the various sectors of the economy and the public of metric activity.
>
> – A well-developed plan and effective coordination by industry and all sectors of the economy must be accomplished.
>
> – A voluntary conversion must eventually become mandatory through laws and regulations, etc., in order to complete the metrication program.
>
> – Overall and specific target dates must be used.
>
> – The public must be adequately informed and educated, and responses must be made to consumer concerns because conversion of the retail sector is most difficult.

> – Letting costs lie where they fall can be adopted in whole or in part.
>
> – Government purchasing power can be used to propel the conversion.
>
> – The conversion of certain sectors, such as in sports and weather forecast, can aid in metric education.
>
> – Periods of dual marking should be kept to a minimum
>
> – Hard conversion of products is more desirable than soft conversion whenever practicable to obtain benefits.

The list provides a set of very good guidelines for the most part, other than allowing for dual marking. Whoever wrote this section of the 1978 GAO report has a good understanding of the problems involved. Surprisingly, they also offered a very self-introspective view:

> Another difference between these countries and the United States is the type of governments. Basically, the foreign countries have a parliamentary type of government in which the executive is also the leader of the legislative branch. Two of the foreign countries only had to change national laws to effect metrication. Australia, with six State governments, and Canada, with ten Provinces, had to change some local laws. The changes appeared to be well coordinated. The United states has a Federal Government and 50 State governments. Metrication would necessitate revisions in the laws of each of these government entities. Because of the differences in government, the other countries' decision making process, including changes to laws, regulations, ordinances, and codes, is less complex than the United States. (30-4)

The Report points out the frozen nature of the US Republic:

> Other countries established their metric organizations early in the conversion process. One month after Australia enacted its metric legislation, the metric board had its first meeting. In New Zealand the metric board had its first meeting 10 months after the decision to convert had been made.

 

> The Metric Conversion Act of 1975 provides for a U.S. Metric Board to coordinate the voluntary use of the metric system. .... However, the Metric Board had not become fully operational at the time this report went to print, more than 2 years after passage of the act. (30-7)

In Chapter 31 the GAO exposes the misuse of the word voluntary in 1975:

> In other countries that are converting, "voluntary" means that the various sectors voluntarily agree on how and when to convert within the over-all parameters of a national commitment to convert to the predominant or sole use of the metric system during a specific period of time, usually within 10 years or less. In other countries voluntary was not a choice of whether to convert or not, as in the United States.

In the 1975 metric hearings this confusion about the word "voluntary" was used to falsely equate the legislation passed by Congress with that of Australia and other countries.

The GAO Report explores a wide spectrum of industries, and how they reacted to possible metrication. The section on fasteners is an example of how the US viewed itself with respect to the rest of the world. The first sentence of the fastener section reads:

> The U.S. fastener industry which was originally opposed to metrication, began conversion efforts in 1970 in order to maintain its markets.

The industry found that in the 1960s their major customers were moving toward the metric system. One would think the US fastener manufacturers would have been in favor of metric by 1978, but the story is more complicated than expected and perhaps too American. The Report has a nice description of a fastener:

> A fastener is anything which holds two things together. Nuts, bolts, screws, rivets, cotter pins, and nails are a few examples. (See following page.) Of these, the United States produces approximately two million different types. Fasteners can hold together a vast number of items. For example,

  

> a telephone is held together with about 70 fasteners. Jumbo jets contain millions; and for one model, fasteners costs represent about 10 percent of the planes total cost. In short, much of the nearly $2 trillions U.S. economy is held together by the $2 billion fastener industry.

The report notes that a considerable increase in the use of metric fasteners is taking place in the US. The domestic fastener industry was also under pressure from imported Olde English fasteners. At the end of the 1960s, no US engineering standard for metric fasteners existed, but an international standard did. US industry representatives claimed that the international standard had too many sizes and thread types. The values of these sizes did not follow a logical pattern it was alleged. If the US fastener industry was going to become metric, it was argued that the US should create a new fastener system that was:

> ....as perfect as possible. Also, the industry did not want to give a competitive advantage to foreign producers of metric fasteners. It was felt that the foreign producers would gain an advantage if the U.S. industry merely accepted the existing international standard for metric fasteners in its entirety.

US industry was going to produce a "more perfect fastener" or perhaps even a perfect fastener, and in January of 1971, the report "A Study To Develop An Optimum Metric Fastener System" was released by the Industrial Fasteners Institute. The study was presented to the ten largest corporations in the US as well as the National Bureau of Standards (NBS), and technical bodies in Canada. The selected group was unanimous in its view that a detailed study should be undertaken. The GAO Report states:

> The Committee's ultimate objective was to design a metric fastener system which would be so attractive technically and economically that it would become the single internationally accepted system of threaded fasteners. (7-5)

An unshakable US faith in technical Darwinism, coupled with the belief the hubris that the US would create the fittest fastener meme, propelled this new study. The Special Committee published its results

 

in 1973. It recommended a fastener system with 25 sizes and a single thread type. The first metric fastener standard based on these recommendations was released in 1974. Before the standard was completed, the new system was encountering international resistance. Britain and German standards representatives released a paper titled "Why Should the International Standards Organization System for Metric Fastener Threads be Changed?" It argued that the costs and confusion were unwarranted, "the technical advantages were minimal, and the system could hardly be called 'optimum.'" There were complaints of protectionism, and everyone having to start all over again. (7-6)

The discussions continued from 1973 to 1977 as the ISO[1] negotiated with its US members. The US representatives finally backed off from the proposed changes to the international standard. The US standard became essentially the same as the preferred series of the ISO standard.

There was controversy about the strength grade of fasteners in the 6 to 18 millimeter range. Europeans used an international strength grade of 8.8. It has a strength capacity of 116 000 pounds per square inch. The comparable US SAE is grade 5, which has a strength of 120 000 pounds per square inch. This is about a three percent difference. It was recommended the next higher grade 9.8 be used. This fastener has a strength of about 130 500 PSI.

The Europeans went along with the proposed change, but only the US automotive industry adopted the higher grade. US farm equipment, Canadian and European manufacturers decided to use 8.8 for their threaded fasteners. The unavailability of fasteners that met the US requirement caused concern that an 8.8 fastener could be interchanged for a 9.8 version during a repair. If 9.8 was not available, it would be necessary to use 10.9, which requires an alloy steel.

The report next focused on the head sizes for the fasteners:

> A major problem arose during the attempt to reach agreement on the hexagon head size for three fasteners. This was probably the most hotly debated and difficult issue considered during the 1977 ISO meetings. The schedule below shows the head sizes wanted by the United States, those used in Europe, and those agreed to at the meetings.

[1] International Standards Organization

| Fastener sizes | Hexagon head sizes | | |
|---|---|---|---|
| | Wanted by the U.S. | Used in Europe | Compromise sizes |
| | (in millimeters) | | |
| 10 | 15 | 17 | 16 |
| 12 | 18 | 19 | 18 |
| 14 | 21 | 22 | 21 |

Figure 8.1: Bolt head sizes from the 1978 GAO Report

> The Optimum Metric Fastener System study had shown that the head size for a number of fasteners was unnecessarily large. International standard sizes were widely used in Europe, but the European representatives had in 1975 agreed to reduce the head size 1 millimeter on each of the three sizes. The U.S. representatives agreed to the compromise sizes in the earlier meetings, but in 1977 returned to the demand for a smaller head for the 10-millimeter fastener size.

The Europeans would not approve an inclusion of a 15 mm head and the US would not compromise. The official standard became 10, 12 and 14 millimeter diameter fasteners with 16, 18 and 21 millimeter heads respectively. The US would use these and the 15 mm head. It became possible that several head sizes might be used for these three fastener sizes. The Report noted:

> Head sizes (like strength grades) are an example of an international standard which is formally agreed to on paper but not uniformly adhered to in practice. (7-8)

The European view was that the benefits of the changes to the new system did not justify the expenses involved. The fastener standard is voluntary, and the US could do whatever it wanted. This impasse could leave US fastener manufacturers holding the bag. The GAO report states:

> An official of one company told me he had stuck his neck out and stocked six metric sizes in 24 lengths. The stock included the 6.3-millimeter fastener which was one of the U.S.-proposed sizes that did not gain international acceptance.

 

> This size was being used by a major automobile manufacturer in its 1977 and 1978 models. However, the automobile manufacturer has dropped it for future models.

It was noted that maintaining Olde English and metric fasteners in the US could cause considerable difficulty:

> It is virtually impossible to visually identify some sizes of customary-threaded fasteners from similar-size metric fasteners. It is possible to mismatch 36 combinations of customary- and metric-threaded fasteners. The result could be either stripping during assembly or full assembly with 25- to 60-percent loss in load capacity. Thus, the accidental mismatch of fasteners could result in fastener failures.

This is a very good argument for a quick metric switch-over, with an M-day, rather than implementing voluntary with an indefinite "transition period"

A Representative of the Industrial Fasteners Institute described the US "Optimum Metric Fastener System" as a "misguided move" in 2014.

The OMFS attempted to eliminate fine threads, this "simplification" was rejected. The US introduction the M6.3 X 1 fastener simply because they wanted a metric version of a 1/4-20 US fastener, rather than using a standard M6 x 1.0 was rejected. The introduction of a new thread gauge was not accepted. The US wanted to replace the hex head with a new spline head, but that was also rebuffed. The changing of hex sizes (head sizes) by 1 millimeter on M10, M12, M14, and M22 is still causing confusion to this day. The US has finally withdrawn its proposed "optimum" metric standard.

The two metric standards that remain are ISO and DIN. DIN is very, very close to the ISO standard. They are 99.99% interchangeable, and 90% identical. The German DIN standard is to be replaced with the ISO standard.

The US introduction of an "optimum" fastener standard in the 1970s has the fingerprints of American hubris all over it. Rather than finally bring some order to the chaos that is side by side US fasteners and metric, by eliminating the "custom"-ary versions, and using ISO metric exclusively, we instead opted to show everyone "how to do it better."

History has not judged us favorably, and the exercise in imposing a US metric fastener "standard" on the world continues to cause discord and confusion to this day.

The 1978 GAO report offers insight into how the beverage industries in the US did, and did not, embrace the metric system in the 1970s. The 1978 GAO Report chapter on beverages indicates a quick change took place in the 1970s, and then the metrication of beverages was frozen in place at near zero kelvin. What happened has become mythologized in the last few decades. The GAO Report is interesting as it comprehensively looks at all the beverage sectors. This section of the report begins:

> Wines and distilled spirits are converting their products to metric sizes for marketing reasons. Both are regulated by the Department of Treasurys Bureau of Alcohol, Tobacco and Firearms; however, the producers requested the change. A considerable portion of their products are now being sold in metric sizes.

The Report notes that soft drink manufacturers have introduced products with metric volumes in many areas of the US. However, the soft drink industry "did not plan an overall metric conversion in the near future." Milk has labels with metric equivalents, but had no plan to change-over to metric sizes. The beer industry had no plans to become metric, but would in some cases put equivalent metric quantities on their labels. Currently, a considerable number of microbrewries have taken to using obtuse and archaic units as marketing strategies by selling "growlers" and other volumes for novelty appeal.

The Report first discusses the wine industry. They decided to convert their entire product line to metric. Amazingly:

> ...it was the Wine Institute, a trade association representing California wine producers, that petitioned the Bureau to convert to metric sizes and reduce the number of permissible sizes.

The organization wanted to reduce the number of permissible sizes from 16 customary to 7 metric sizes. A table is then included that shows only 9 of the 16 customary sizes were in general use.

 

> The Wine Institute made the request because many imported wines were being sold in bottles containing up to several ounces less than the 4/5 quart (the fifth 25.6 ounces), the most common size used by domestic products. The bottles used for imported wines appeared to contain the same amount of contents as those used for domestic wines. The industry believed the practice was deceptive to consumers and gave foreign producers an unfair competitive advantage.
>
> At a hearing held on the Wine Institute request, it was brought out that imported wines should not be required to use customary-size bottles because the National Bureau of Standards study had recommended that the United States switch to the metric system over a 10-year period. Subsequently, the Bureau denied the request because it considered it inappropriate to require foreign wine producers to use customary-size bottles for sales in the United States.

It appears that the wine producers first wanted to force foreign manufacturers to produce wines in Olde English, but because alcohol is one of the few government regulated industries in the US. The NBS had the authority to tell the wine producers they had to switch to metric. It appears as clear as a summer day, that given their choice, the wine manufacturers would have forced foreign manufacturers to produce a set of bottles in Olde English for the US and metric for the rest of the world

As it was:

> The Wine Institute selected the 750-milliliter (25.4 ounces) size as the primary size because it was very close to the 4/5 quart (25.6 ounces) which comprised about 48 percent of the industrys sales. The 750 milliliter was also used in other countries. Four other metric sizes—the 3 liter, 1.5 liter, 375 milliliter and 187 milliliter—were selected by the Wine Institute because they were multiples or sub-multiples of the 750 milliliter and thus would enable consumers to make price comparisons between sizes. Selection of the 375 and the 187 milliliters also permitted continuation of sizes similar to those consumers and the industry were familiar with.

  

Miraculously, the NBS held a public hearing on the subject, and all the persons who spoke were either for the conversion or didn't oppose it. The NBS took written comments. 40 comments were submitted, and only three were opposed to the metric switch-over.

In June of 1974, the NBS approved seven metric sizes. Six had been requested by the Wine Institute, plus the 100 milliliter, which "had been requested by foreign wine producers, importers, and airlines to permit importation of sherries sold in one-person servings." The conversion period would be 4 years beginning in January of 1975 and ending on December 31, 1978. Four years was chosen to allow for existing glass molds to wear-out. Foreign wine producers would now have to conform to the US metric size requirements.

The conversion process was nearly complete in October of 1978, when the GAO Report was issued. The amount of time given allowed for the orderly transition that took place. The largest snag was not technical but legal. Tax law was written using Olde English units, and the producers had to convert the values for tax purposes. In this case, the producers put the metric conversion to good use by introducing reforms that might not otherwise have taken place:

> ... One wine company official told us that about $12,000 annually in storage costs will be saved because of the new shape, a 375-milliliter bottle, will be used to replace three, 4/5-pint bottles that the company previously used. Changes in other bottles could also result in some savings to the industry. These changes could have been made without converting to metric, but the metric conversion was viewed as providing the opportunity to make the changes.

The use of metric units by the authors of the Report is seen to reflect pre-metric usage of expression. The first is the archaic Olde English notion that one should immediately switch from milliliters to liters when encountering a value of 1000. Rather than switch to liters, one should continue using milliliters and not change metric prefixes, and therefore units. The values adopted were: 100 mL, 187 mL, 375 mL ,750 mL, 1000 mL and 3000 mL, where the 1000 mL was changed to 1 L and 3000 to 3 L.

Indeed, one can use the 750 mL size as a standard price touchstone, but only if the store carries that particular size for the wine you desire.

 

A go-to way to describe the price is in dollars (or cents) per 100 mL. If the 100 mL item is shown as $2.00 per 100 mL and the 750 mL bottle has $1.45 per 100 mL, then it is very easy to compare, just like metric fuel efficiency, which is written in liters of fuel per 100 Km. Each item should have a price per 100 mL for comparison.

The GAO next indicates that consumers will receive limited benefits. They immediately argue:

> The 100 milliliter will be more difficult to make comparisons with than the other sizes; however little use will be made of this size, and consumers will feel little impact.

and:

> ... Also, sizes such as 4 and 5 liters cannot be easily compared in volume to other metric sizes, such as the 750 milliliter and the 1.5 and 3 liter, thereby defeating another of the original aims of metrication.

The Department of the Treasury finally offered an official chart two years after the metric wine conversion had taken place.

Once again, we see the metric sizes treated like Olde English sizes, with liters and milliliters, rather than just one unit. The cultural inertia to continue with factors of two makes metric seem unwieldy. This practice continues on their more graphically designed chart shown in Figure 8.2

The distilled spirits industry also converted to metric and decided to reduce the number of sizes. The GAO seems shocked they decided to do so using metric: "The size reductions could have been achieved without metrication." Again a table is offered for the new sizes

What makes the distilled spirits table in Figure 8.3 so unusual is not its metric quantities, but that it has a mandatory date for metric conversion of January 1, 1980. This is a singular situation in the history of metrication in the US, where the conversion was not voluntary.

The metric sizes used by the distilled spirits industry are more rational than those of the wine industry at 50 mL, 200 mL, 500 mL, 750 mL, 1000 mL and 1750 mL. As seen previously with the wine industry, the chart immediately changes the 1000 mL and 1750 mL to liters, which introduces a cognitive discontinuity.

  


## Comparing the New With the "Old" Bottle Sizes

| NEW METRIC SIZES | APPROX. FLUID OUNCES | OLD U.S. SIZES | APPROX. FLUID OUNCES |
|---|---|---|---|
| 100 ml | 3.4 | Miniature | 2, 3 or 4 |
| 187 ml | 6.3 | 2/5 Pint | 6.4 |
| 375 ml | 12.7 | 4/5 Pint | 12.8 |
| 750 ml | 25.4 | 4/5 Quart | 25.6 |
| 1 Liter | 33.8 | 1 Quart | 32.0 |
| 1.5 Liter | 50.7 | 2/5 Gallon | 51.2 |
| 3 Liter | 101 | 4/5 Gallon | 102.4 |

Department of the Treasury Bureau of Alcohol, Tobacco and Firearms

ATF P 5100.7 (12-78)





Figure 8.2: Official wine volumes from the 1978 GAO Report

DEPARTMENT OF THE TREASURY
BUREAU OF ALCOHOL, TOBACCO AND FIREARMS
**DISTILLED SPIRITS**

| BOTTLE SIZE | EQUIVALENT FLUID OUNCES | BOTTLES PER CASE | LITERS PER CASE | U.S. GALLONS PER CASE | CORRESPONDS TO |
|---|---|---|---|---|---|
| 1.75 liters | 59.2 Fl. Oz. | 6 | 10.50 | 2.773806 | 1/2 Gallon |
| 1.00 liter | 33.8 Fl. Oz. | 12 | 12.00 | 3.170064 | 1 Quart |
| 750 milliliters | 25.4 Fl. Oz. | 12 | 9.00 | 2.377548 | 4/5 Quart |
| 500 milliliters | 16.9 Fl. Oz. | 24 | 12.00 | 3.170064 | 1 Pint |
| 200 milliliters | 6.8 Fl. Oz. | 48 | 9.60 | 2.536051 | 1/2 Pint |
| 50 milliliters | 1.7 Fl. Oz. | 120 | 6.00 | 1.585032 | 1, 1.6, & 2 Oz. |

Official Conversion Factor: 1 Liter = 0.264172 U.S. Gallon.
Mandatory date for conversion: January 1, 1980.

ATF F 5100.10 (9-76)

Figure 8.3: Official distilled spirit volumes from the 1978 GAO Report

> The conversion is also being carried out under regulations prescribed by the Bureau. However, it was the Distilled Spirits Council, a trade association which represents about 95 percent of the distilled spirits industry, that petitioned the Bureau for permission to convert to metric sizes and reduce the number of permissible sizes. Among the reasons given by the Council for wanting to convert were to (1) reduce production costs, (2) permit marketing and distribution efficiencies, (3) provide better service to the public, and (4) promote exports. (26-18) and (26-19)

The GAO claimed that the change occurred because of: "The legislation by the Congress directing NBS to study metrication also stimulated the industry to consider converting to metric."

The agreement by the European Economic Community to use 17 metric sizes for trade among the member nations was also a factor. There were arguments about what sizes to adopt, but not the fact that the industry would become metric.

When the conversion was announced in 1976, the Bureau Director stated:

> ... the change to metric would (1) reduce significantly the number of bottle sizes, (2) provide enough separation between sizes to deter possible consumer deception, and (3) make calculations easier because of round numbers. (26-20)

It is surprising that the Bureau Director cites the use of round numbers, but does not note the change from milliliters to liters as cognitive problem.

The cost of conversion did not seem to be much of a deterrent:

> One distilled spirits official described the conversion as posing no difficult problems for his company. He said the company is constantly making changes in its operations. New bottles are introduced, new labels developed, and production lines are adjusted to handle bottles of different sizes with varying contents. He viewed the change to metric as just another change; one not much different than his company faces on a day-to-day basis.
>
> Another official of a distilled spirits producer told us that his company estimated it would cost $1.5 million to make the conversion. ".. This amount, however was not considered substantial in that it amounted to less than 0.5 percent of the companys annual sales."

One company didn't seem to see the costs as attributable to metrication, as they had timed the transition to coincide with a time when they were replacing worn-out glass molds with new ones. The GAO spends more time asserting that metric will make price comparisons harder, and still does not mention price per 100 mL as an option. Once again, milliliters and liters are implemented by the Treasury.

The choice of 750 mL is based on one-fifth of a gallon. This has produced an incompatibility with Europe and affects our international trade. The operators of Montanya Distilleries in Crested Butte, Colorado make rum, and wanted to expand their sales into Europe. The problem is that US bottles are 750 mL and European bottles are standardized at 700 mL. The distillery could not obtain 700 mL bottles in the US so they had two choices. The first was to import 700 mL bottles from Europe, fill them with rum, and then export them back to Europe. This was definitely cost prohibitive. The second option was to obtain

 

permission to send the rum over to Europe in bulk and have it bottled there. The distillery chose the second option, which employs Europeans and their glassware industry.

There is more to the story however. Most of the world had adopted the 750 mL size as standard, but in 1990 the European Union (EU) legislated that liquor bottles were now required to be 700 mL, whereas wine and soft drink bottles would remain 750 mL. This is an example where a group of countries introduced incompatibility with world standards, rather than conforming with them.

The soft drink industry is examined next by the GAO, and here there is a bit of a surprise:

> Use of metric size containers for soft drinks began in April 1975 when a major soft drink company introduced the liter size in one of its marketing areas. The company wanted to use the new bottle which, while shorter, would cost less since it contained less glass and would perform better on production lines. The new bottle would also permit a 20-percent savings in space for bottlers because (1) more cartons could be placed in the same amount of space, (2) increased payloads would be possible for trucks, and (3) more storage capability would result in warehouses. Also, customers preferred the new bottle. (26-30)
>
> The company viewed using the liter as an opportunity to be the first in the soft drink industry with the metric system.

Yes, the liter size was first introduced in the US, and not the ubiquitous 2 liter bottle. "...the company also began use of 1/2-liter and the 2-liter sizes. Both refillable and nonrefillable metric-size bottles were used." (26-31)

But like beer, there was a demarcation:

> All the metric soft drink changes that we are aware of involved soft drinks sold in bottles. No soft drinks were being sold in metric-size cans. Soft drink industry officials told us that no conversions involved cans because the costs to convert can production facilities would be too high, about $1 million for each can production line. Also, concern was expressed on the impact changing can sizes would have on vending machines.

  

It is clear that machines wear-out, and small aluminum cans of soda have been introduced over the years. It is very difficult to believe that in the last three decades, an opportunity did not arise to make soda cans metric. The desire to decrease the amount of material used to produce each can is monumental, it would only make sense to change from a 355 mL can to a 350 mL can, yet this has not occurred. In recent years aluminum "bottles" of soda have made their way onto US shelves. Could they not have been changed over to metric from 251 mL to 250 mL? Such is the cultural inertia that stifles US change.

The soft drink industry also saw voluntary metric conversion as meaning optional metric conversion. They assumed if metric was not voluntary, the government would impose how they would do metric, rather than just saying you have to go metric, you figure out how you would like to do that, but you must become metric as has been done in other countries.

The GAO praised the soft drink industry for using "1/2 liter, liter, and 2 liter–[which] are multiples of one another." This in their view made it easy for consumers to compare prices. If the soft drink industry had actually been compelled to convert then what is said next would not still exist:

> Soft drinks are sold in 15 customary size containers–6-1/2, 7, 8, 10, 12, 16, 24, 26, 28, 30, 32, 36, 48, and 64 ounces. Many of these sizes do not lend to easy price comparisons with other sizes. Also many soft drinks are sold in cartons having 2, 4, 6, 8, or other quantity containers. Because of this, the soft drink cartons consumers purchase come in sizes such as 39, 42, 96, and 128 ounces–quantities which do not lend to easy price comparisons.
>
> If there were a complete conversion to metric sizes, this could help facilitate consumer price comparisons, particularly if rational sizes like 1/2 liter, liter, and 2 liter are used. For example, the price of a carton of eight 1/2-liter bottles (4 liters) could easily be compared with the price of four 1-liter bottles or two 2-liter bottles. The same advantage could be achieved, however, if soft drinks were sold in customary sizes that were multiples of one another.

The GAO just had to take a jab at metric. Without a metric switch-

 

over what opportunity might present itself to change the custom(-ary) units to a more rational series?

The GAO report moves on to milk:

> The sizes in which milk may be sold is strictly regulated by various state laws. At present, the 1/2 pint, pint, quart, 1/2 gallon and gallon are the most commonly used sizes. They are all multiples of one another which makes price comparisons for consumers simple.

The GAO seems to ignore difficult comparisons such as the half-pint to the half-gallon. The paragraph goes on:

> Other sizes permitted include the gill, an amount equal to 1/4 pint, and 3 quarts. The 3-quart size is permitted in about 20 states but is not widely used.

This points out again that weights and measures in the US have been left to the individual states, and the Federal government has been asleep at the switch since at least 1797. This means:

> The States have not approved the sale of milk in metric sizes. ... It appears that if conversion occurs, the most frequently used metric sizes would be as follows.(26-35)

In their speculation, they cite 250 mL, 500 mL, 1 L, 2 L and 4 L, again eschewing milliliters after they meet 1000 of them.

They point out that "Each of the above metric sizes is about 6 percent larger than the customary size it would replace."

Beer producers vigorously opposed any metrication efforts that would make its container sizes obsolete. Again:

> The sizes in which beer is sold is regulated by the States and many different sizes are authorized. Under the Federal Alcohol Administration Act, the States are provided the authority to regulate beer sizes. The sizes most widely used are 7, 12, 16, and 32 ounces. Revisions of laws in many States would be necessary if the industry converted to metric sizes

  

Strangely, it was cost effective for the soft-drink industry to change their bottles, but the replacement of 12 ounce bottles of beer would be prohibitively expensive?

> Several industry officials believed it was inevitable that the industry would convert to metric. But, they believed conversions would not occur for many years unless required by the government. ... Industry officials believed that the United States should continue a voluntary policy of converting to the metric system. (26-36)

As we have seen, voluntary metric means no metric.

The GAO Report has an interesting history of the mixed-bag that is the beverage industry. The wine and distilled spirits world became metric, the soft drink industry added metric to the mix, and the milk and beer industries flat-out rejected metric and had their way. To this day, the weights and measurements situation in the beverage industry remains frozen in the 1970s.

 